

**The Emergence of Competence
in the Breakdown of
Goal-Directed Education
Part II: Materials-Directedness
as Educational Method**

Inger Bierschenk

1999

No. 73B



**Copenhagen University
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**Lund University
Sweden**

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Preface

This topic is dealt with in two separate articles. The first is a kind of perspective paper, which introduces a series of articles within the current and burning area of *competence* and *competence development*. The second is an empirical testing of the way in which I believe competence will be described and measured in the future. My position is that competence can be equated with *synthesis*. For this reason, we can only get hold of it through a person's speech or writing. Synthesis comes about in the moment of production and can only be studied a posteriori (B. Bierschenk, 1995). A similar idea is put forward by the Swedish association of academics, SACO (1998). In a policy report, SACO refers to a researcher in administration, Otto Granberg, who concludes: "Competence does not show up until it has been proved".

The education in schools and elsewhere is facing great changes in these days. It is especially interesting, since we are rapidly approaching a century and even a millennium shift. The alterations within the area of education seem to be connected to new conceptions of knowledge, which is a result of new techniques, making it possible to communicate all over the world, quickly and effectively. The rising generations of students have taken the computer to their hearts (or have to do so sooner or later) just like earlier generations used the paper and pencil to communicate with others. Modern times almost always generate novel patterns of communication and our time is undoubtedly marked by the electronic modernism.

By the development going on around us, which I just touch upon, I feel as if we are crossing the threshold of a new era. Within certain circles it is called the ITera, and why not, if they mean that the technique requires novel ways of attacking the education efforts both in the public and the private sector. Competence development has become the key word, which provides companies as well as organisations with a lift into modern thinking around the production of goods, services, and knowledge. However, in order for novel ideas to come about, there is often a need for novel methods and models.

Anders Leijon (1992) discusses competence development in Swedish trade and industry, for example with the Civil Service Department ("machine"), the Works Factory, the Engineering Firm, and the Knowledge Company ("enterprising") as models. The machine model (my analogy), which is top governed, rules the entire school system. "The teachers, the ones who have produced the instruction, have had small chances to influence the organisation" (p 41). The other extreme is the Knowledge Company, where the staff daily learns new things and adapts to changes. A prerequisite is, according to the author, an almost flat organisation (see also Wikfeldt, 1990). The Swedish Employer's Confederation (SAF) is pursuing an innovating work on learning in organisations. Its policy rests in principle on the opinion that education today is to a great extent out of time (SAF, 1998). Thus SAF would like to see the teacher training be organised like an apprentice system.

I will not discuss the organisational changes, which will follow as a result of technical progress. But the out of time - condition perceived by SAF is a result of the fact, that the dynamics within a structure, for example an able and responsible staff, is hard to make visible, when the organisation has no channels for letting the flow stream. One way of getting at the problem is to elucidate what competence actually is. I mean that an insight into the phenomenon would facilitate that the company's or organisation's potential for the activity it stands for comes into view.

In order for the staff of any kind to be competent for its tasks in a changeable work environment, it must be able to survey the situation and to produce a leading

synthesis in speech, writing or actions. What I discuss in the first article and apply in the second is, in fact, the description of synthesis, as it is expressed in writing. I use texts, which are produced for education in the history of ideas, culture, and literature at the Swedish gymnasium level (corresponding to upper secondary or college).

However, I would like to strongly point out that this issue is not addressed to ordinary teachers only. My research and teaching have given me good insight into the cognitive conditions for work efforts on various kinds of organisational change, which, of course, serves as a background in this work, too. Already in 1986-87, I have studied Volvo mechanics' perception of the company's service information manuals. The study showed that mechanics in different countries want to have the information structured in different ways, depending on their conception of the conditions for doing a good job. A consequence for Volvo's policy was to build these differences into the material to guarantee an efficient service at the garage.

Since two years, I participate in a Swedish-Danish research project, by the name of "Human resources in the work life". My first ideas about the theme of these articles, I recently put forward at a conference organised by the board of the Danish Research Councils (I. Bierschenk, 1999). At this occasion, representatives of the work life pointed at the importance of getting hold of the concept of competence to be able to use it efficiently. With this issue I want to give an example of the way in which an efficient governing of an activity can be brought about by defining competence in a novel way. My idea is to change the thinking about goal directedness toward material directedness. I will show how the conceptual relations of a material can be made the basis for judging the effectivity of teaching, instruction, or work processes.

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Abstract

This is the second article on the competence theme, which aims at demonstrating the consequences of a new educational paradigm, namely materials-directedness. By this is meant the conceptual control of the built-in disparity of educational materials. By means of a new method for structural analysis (in a biological sense), it is shown how conceptual relations and dimensions of a literary text are laid bare. The demonstration text, which is a description of the idea of Behaviourism, is analysed and discussed with respect to the underlying structural relations. It is pointed out that text materials, such as novels, may be characterised by difference in conceptual depth and that competence is a matter of conceiving this predefined character. In such a way the teacher would be freed from stating preferences about texts, because the levels of aspiration lies in the materials.

The Problem in Short

This article is the first follow-up of "Thirst for Learning – a Myth" (I. Bierschenk, 1999b) which reported on and discussed the state of the art in today's educational milieus. One problem that future educational organisers have to face is to recognise the specific difference between qualification, which is usually dealt with in school, and competence, which everybody think they can define, although it is new in school settings. Should we be able to build disparity in the form of conceptual levels into an instructional material, or analyse the material already in use, as for example pure literature, so that its structure becomes known, then evaluations of various kinds are superfluous, because they are used to measure something unknown.

But – most of the readers tell themselves – school has always been dealing with structure, hasn't it? Of course it has, from an epistemological point of view, maybe. And in that case, structure is equal to the presentation of the logic of a curriculum and a syllabus. When you regard knowledge of this kind of logic as competence, then you have not understood, that you cannot produce competence by subject grinding. Structure is nothing you can see, take or point at. It is an inner quality, to which school so far has not been capable of educate, only hopefully support the acquisition of. When I talk about 'material-directedness' I do it from out of the discovery, that an instructional material may be specified as to its inner qualities and that these are experimentally bound to various conceptual depths. Thereby, an empirical definition of competence has been reached, which I hope will be placed in school and universities. The competence of the student in passing a course then becomes a matter of a fruitful encounter between the personal inner qualities (synthesis) and the structure of a course material. At least the latter has not been proved so far. Why else would it be so hard to construct tests?

Research in the Field

This part of the reporting aims at pointing at a possible pedagogical renewal. I therefore refer to articles that are of importance in understanding the labour for getting there. Central is the method I apply for my analysis, which has been developed by my husband, Bernhard Bierschenk, and myself. The method has generated several research areas and since it is unique – in both an international and an interdisciplinary comparison – there is no other research to which I can refer in this kind of article.

From Content to Structure

To the question (above) why constructing tests is so difficult, there is an obvious answer: Structure is often mixed up with content, which may be interpreted in many ways. So far there has not existed any key. I will take a concrete example, the most natural of which comes from the subject of Swedish teaching. For an explanation of what I call 'level' I refer to the introductory report (I. Bierschenk, 1999b, p 9), where I bring an account of the three frames of reference for the interpretation of the concept of competence. When a teacher of Swedish "structures" a pure literary area of study he/she will depart either from a common interpretation (epistemological level) or from a personal interpretation, which he/she has built up emotionally or motivationally in interaction with the class (psychological level).

According to the first level, the students must learn to analyse texts from out of aspects of content, such as the portrayal of milieus and persons, narration techniques, message or overall idea, etc. I do it myself, and have got an experience of which aspects are difficult and easy to apprehend, generally. This level is standard

and therefore relatively simple when it comes to determining goals and criteria for grading. What the pupils learn by studying the subject is classification, that is a logical ordering of associative connections, with which everybody can agree.

The second level to a higher extent builds on the feeling teacher and students have for the literary text. Literature study will be made a method for widening one's seeing in general, preferably in co-operation with other subjects, or for influencing the students' conduct vis-à-vis themselves. (Teachers working like this can mention more purposes, I'm sure.) This level is the preferred one in Swedish curricula of today. It has advantages, in such a way that it underlines, that reading literature has to do with personal experience. Thus, the pupil who in his world of thoughts does not find himself on the same level as the world of the novel in question cannot apprehend it. How knowledgeable! The teacher must meet the pupil on its own level, is the wording of the mantra. I believe, however, that one of the purposes among teachers of Swedish is to try to raise the pupil's level and this is where the problems show up.

The student being exposed to a teacher's efforts to change his/her seeing and self-conduct often reacts with frustration or aggressiveness, if not sorrow for the uncovered disability. The instructional method itself is the villain. Because, when you appeal to feelings and personal experience, you must not be surprised that students react emotionally. I think this is one of the profound reasons that many students do not accept their grades; they take it for a judgement of their person (which may surely be true in many cases).

A step in the right direction is the new grading system in Sweden. But I also think that the criterion-related judgement would be supported, if it were founded on the structure of a material or task, that is concepts and their interrelations, around which the instruction could be centred. As it is now, the whole good idea is applied only halfway. For example, there is a difference between teaching around (1) "have knowledge about authorship, epochs, and currents of ideas ..." and (2) "in speech and writing be able to formulate impressions and observations in connection with the reading" (from the curriculum of advanced course in Swedish). Still it is common that the students get the task to formulate an essay within the first goal. The teacher has of course the freedom to combine goal and exercises as he/she thinks best (compare the national tests in Swedish for gymnasium level) but how can we be so sure that the combination makes it easier to assess the student essays. A great part of the students' difficulties in understanding the applications of the criteria is grounded in the combined exercises. I have the experience that irrespective of what a writing exercise concerns, students think that linguistic criteria are the most important (the force of habit?).

I think it is about time to begin working for the third level, namely the biological or system analytic. With this report I would like to give an example of a possibility to develop a structural key to texts, which are rich of synthesis, by pointing to the conceptual structure of a material. Competence is then defined as the relation between the conceptual density (or depth) of a material and a student's level of ambition. This means that the student must be presented to the conceptual structure of a given material, for example an authorship or ideational sphere, and then be given the chance to decide if he/she wants to cognitively work up that structure or not. However, this does not mean that he/she will succeed, because we know that there are those who over-estimate their abilities, especially within certain gymnasium programs (compare I. Bierschenk, 1999c). I believe, however, that the natural differentiation taking place when the material will be directive, will contribute to piece and quiet. Above all, the student will realise his/her restrictions and possibilities without a

teacher making choices and expressing preferences. The teacher should "let the student grow with the material" will be the wording of our new mantra. But in contrast to the former, this one may be made a strategy. (I do not discuss the organisation of the studies, which is another subject.)

Materials from an Educational Experiment

Since I am associated to a gymnasium school, I have been able to apply and test the ideas on the competence concept in my classes (I. Bierschenk, 1997a, b; 1998). A course in Swedish, advanced level, that I carried out during the spring term 1997, amounted to teach four classes (about a hundred students) about some modernistic concepts. It concerned mainly to explain to them the so-called "isms" in arts and literature, for example the behaviourism, the futurism, the structuralism, the surrealism, the functionalism, and the expressionism. In particular I let them study the way in which these concepts or ideas have been transformed both in models of societies (on video) and in literary texts (novels).

There exist three accepted basic models, paradigms, which are used in the study of human behaviour from individual to civilisation level. One, which is known to learning psychologists, is the behaviourism or S-R -theory. The second is known by the name of the process model, at least to technologists, and may be likened with the functionalism. The third is the more humanistic or structure model. These three models are difficult to transform to models of societies to various degrees, and also to characterise in literary form, depending on various degrees of conceptual depth. In the course, I used them such that I tried to make the correspondence clear between the paradigms and the cultural and literary concepts (ideas) behind behaviourism, structuralism, and functionalism/process. The course was ended up by a comprehension test. The test consisted of 15 short texts, which I constructed, in such a way that each of them was an indirect description of a modern idea.

The comprehension of ideas, in the study defined as competence, turned out to be the same in natural science, social science, and aesthetics students. However, the concepts differ as to depth (in the sense of degree of difficulty). The establishment of depth could be made because the concepts had been related to the three paradigms, whose structure is already known. By that, I was able to empirically determine the theoretical foundation of the test, which is important for the continuing studies. The result gave rise to the idea that, instead of discerning students by their qualities examine whether it would be feasible to determine the qualities of various kinds in a material. Thus the next step was to take a closer look at the texts of the comprehension test. If one can define the structure, that is the conceptual depth, then it would be possible to select materials for different students and different achievement levels.

Materials on Theoretical Grounds

The concept 'degree of difficulty' will not be used in the continuous discussion, because it is context dependent. But I will use the result for my presentation. Hundred students think that Sweden is a behaviouristic society and that such a society is the ideal one (I. Bierschenk, 1998). Not surprisingly, the behaviourism contains the structure, which to all the participants in the investigation were easiest to apprehend, irrespective of study program. Whether this result is due to the teaching, the material, or the students' predisposition can not be answered. We will soon look at and discuss whether the apprehension may be related to the degree

of structural depth in the text. Structurally deepest were the concepts of the structuralism. Between these two endpoints we find the functionalism, which in depth was placed nearest the structuralism. To be able to discuss the results in principle I take only one example, which is placed within the behaviourist paradigm. The text, thought as a reply by a certain Dr Watson, is worded:

“Give me a dozen well shaped, healthy children and I guarantee that I can take each one randomly and train it to become just any specialist you like, doctor, lawyer, artist, yes even master thief, totally irrespective of the child’s ability, interests, race, or ancestors.”

To the reader who has knowledge about the behaviourist paradigm, there are some keys in the text, which may help: ‘randomly’, ‘just any ... you like’ and the phrase beginning with ‘irrespective of’. Further, the person speaking seems to be someone with education in a method and who is quite sure of its effects. You could also classify the person as a social or pedagogical engineer.

We may get no farther than that by the analysis of the *content* of the text. But for an analysis of *structure* we must get under the surface and see what is hidden in the textual depth. Only one method exists that is capable of taking us there (!).

An Objective Method for Text Analysis

For the analysis of the textual structure I have used Perspective Text Analysis (PTA), which treats the dynamics of a text, seen as a time flow. The method, which I developed in collaboration with my husband, is twenty-five years old now. In my latest article, “The essence of text” (I. Bierschenk, 1999a) I present the entire language theory. In this work I also give a list of articles written about theory, method development, and applications.

PTA is the most objective method that exists for the measurement of texts. It does not build on traditional grammar and not on interpretation either. The text analysis shows in a mathematical and consequently in an objective way the relation between the texture-bound concepts, which are formed at the surface of the text, and the connections these have to the structure-bound concepts, which are formed by relations lying in depth. The only step that the user takes is to give names to what comes out of the analysis.

The result from a PTA-analysis can now be presented three-dimensionally (as developed by Bernhard Bierschenk), which is practical when the aim is to show the dynamics of the text without needing to know what it stands for conceptually. But since I am interested in the conceptual structure here, I use a topographical presentation in the form of a net or screen. It gives the possibility to describe how the concepts go together both structurally and dimensionally (see e.g., Bierschenk & Bierschenk, 1993; Bierschenk, Bierschenk & Helmersson, 1996; B. Bierschenk, 1997).

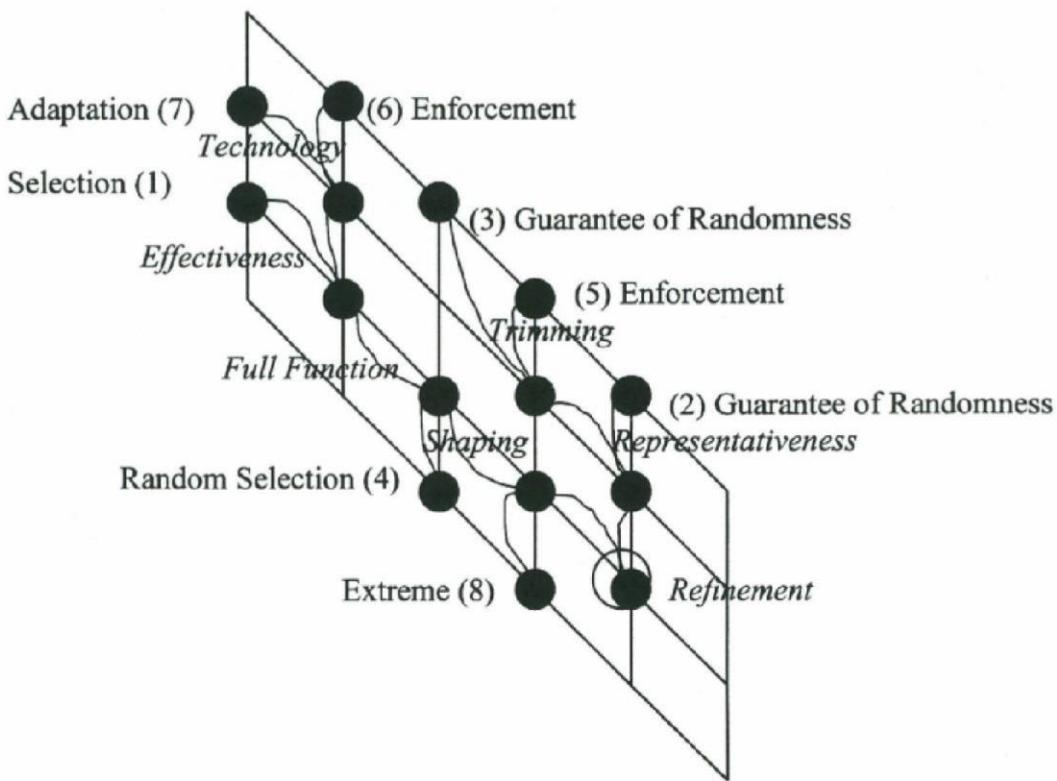
A Behaviouristic Text

Reader’s Guide to Figure 1. The outer concepts, lying at the borders of the net, are formed at the textual place and the inner concepts (in italic) are structural concepts. The connecting lines show how a time flow develops, from the upper left corner and further in a circle so that the net is closed, and how groups of concepts are linked to one another. The deeper embedded they are, the more rings do they take.

Moreover, the structural concepts are forming dimensions, which show up on the vertical axis. I will present the conceptual relations first and their dimensionality afterwards.

Figure 1.

Text Analysis: Behaviourism



Conceptual Relations

Figure 1 shows a simple relational system, consisting of two main groups. The two concepts lying closest in the textual flow are 'Enforcement' and 'Adaptation'. When that which is enforced is exposed to an adaptation this means that we have to do with some kind of *Technology*. What the technology concerns is explained by the concept 'Selection', which adds a component contributing to *Effectiveness*. A clarification of an effective working mode is denoted by 'Random Selection', which gives a certain value to the effectiveness, that is *Full Function*. However, 'Extreme' must be incorporated into this model, because it is a matter of re-forming substantially. For the final concept of this cycle I have chosen *Shaping*.

A substructure now emerges at the upper border. It denotes that the random selection being a prerequisite of the working order has a responsible one, that is somebody, who leads the procedure and guarantees its methodological correctness. 'Guarantee of Randomness' gives strictness to the enforcement, which thus shows up again in a novel relation. What, then, does the strict, responsible one do? Well, he produces some *Trimming*, which, loaded with the properties of the guarantee of randomness, is responsible for *Representativeness*.

The two conceptual structures thus emerging act complementary to one another. The first one has to do with a method for how to reshape organisms and the

other with its scientific manner of working. Both concept groups give an empirical definition of the most deeply embedded concept, *Refinement*.

This is the S-R – theory in a nutshell. Dr Watson wants, just like the animal psychologists, enforce in a technological manner a refined behaviour, a refined species and without any restrictions. The way the test was constructed and presented, I cannot know what the students have picked up from this structure. But since it has been proved that they prefer the behaviourism as model of a society, I dare guess that they read something positive out of, for example, 'enforcement', 'adaptation' and 'extreme'. Because, it is not reasonable to believe that 19-year olds have any feeling for the methodological or scientific aspects of the model ('selection', 'random selection', 'guarantee of randomness'). Thus I think that the surface concepts of the text have been governing to a high extent the conception of the underlying idea and this clearly means that the text needs not be comprehended on a deeper level.

So far we have stated that the structural analysis of the text points at such conceptual relations that may be assumed in accordance with the behaviouristic theory. We have also seen that, for sure, some key words of content may lead us to the right theory but they are far from showing, which structural connections there are and which depth is expressed by these connections.

Whether the students have intuitively conceived the idea of refinement is hard to say. But their attitude toward the model is so positive that it seems quite plausible that they in such a milieu perceive their personal opportunity of "becoming" by the help of training, irrespective of social background, for example. This is the ideal interpretation of the Swedish school system. During the course on ideas, I made the observation that it was much more difficult to have the students see the negative side of behaviourism as well, for instance that shaping as learning method can be used for suppression purposes, too, as in reshaping people within a political system.

At least two conclusions can be drawn from this, namely that the understanding of a theory about humans does not guarantee the comprehension of its transformation in society and that the selection of materials, which shall instruct on the transition from theory to practice, must be transparent. The second conclusion gave rise to my analysis of the dimensions in the text. The dimensions express invariance in the structure, by the help of which the transference of conceptual relations can be made into variable contexts.

Dimensions

If you follow the direction of the flow, you can read out four clear dimensions in the vertical axis. The first has been formed by *Effectiveness* and *Technology*. When something technical becomes effective, no doubt we have to do with a **Machine** concept. For example, we speak about political or bureaucratic machinery, when a system works in a deterministic manner in a certain direction without single persons being able to have an influence on it.

The second dimension, *Full Function*, denotes a working **Method** or capacity of this machine, which should be interpreted such, that the system puts certain functions into operation in order to effectively keep its capacity.

The third dimension tells something about **Design** or polishing of the material, of which the system consists, namely by *Shaping* and *Trimming*. In a societal system of machine-like kind, those measures are necessary to take against single individuals, groups and organisations to avoid unexpected events, which would put grit into the machinery.

Finally, the concept of the fourth dimension, *Refinement* and *Representativeness*, denote that a **Raise in Quality** is focused upon and that this will be generally valid. Embedded here is an idea that a society through standardisation will raise its civil and cultural level. The people of this society have no importance as individuals, only as generators of system products. Well, here we are again. This fashion word to school politicians belongs to the old paradigm.

Behaviourism in a Material

How is the behaviourism expressed in a material in such a way that the dimensions can be discerned? Well, my material consisted of pure literature, so the examples will be taken from novels. I use some 20th century classics, with the aim to give the reader the opportunity to transfer the analysis to the modern literature of preference.

George Orwell's "1984" is a good example of a description of a societal machinery, whose working method contains all the ingredients of shaping and trimming of the subjects. Because, the purpose of the state, represented by Big Brother is to reshape the individuals, their social lives and thinking, so that only one overall idea will be accepted, namely that the ignorance of the collective gives strength to the system. The full function of the subject is shown in such a way that the subject uncritically accepts and serves the new social technology, yes even to the extent that the subject collaborates in the extinction of history and the redesign of the language. No actions and thoughts that may be a mark of individuality have a place in a society based on the behaviouristic machinery.

Alexander Solsjenitsyn describes the way the dissidents of the Soviet epoch were deported to Siberia, for example in the first part of "Archipelag GULAG" (original title), which is called "Prison Industry". In the short novel with the original title "Odin den Ivana Denisovitja", we can experience the function of the totalitarian system, seen as a prison, and of what the humble community member's struggle for life may be made up, when his radius, physically and mentally, is practically none. To make people unsusceptible to impression, for example by putting them in prison, is one way of refining them by correction. Thus the society, of which Orwell warned us, existed as the real dystopia.

A Swedish example of the same basic idea is to be found in the frightening novel "Kallocain", written by Karin Boye. She describes the ways in which a system makes effective its technological supervision of the citizens so that their private sphere can be minimised and how immorality and deception will be the necessary consequence of the assiduous officials' actions. Boye contrasts the machine-like society with the organic. Thus, the "kallocain", the truth serum, the utmost means for refining thoughts, represents the scientific experiment and its collapse when used in the service of a political system.

Degrees of Depth

The concept *Refinement* becomes deepened depending on the way in which it has been transformed in the material. In "1984", it may be discussed within the context of social surface, that is its organisation of administrative functions and oppressive networks. Citizens act against the regime in the story, which means that the reader gets a broad from outside -perspective on the social mechanisms. To the last the model is stronger than the individual.

The story of Ivan Denisovitj pinpoints the human self-refinement, in the shade of a system's destruction efforts. In the correction method lies an intention to extinct

from the system side. The citizen, going into internal exile, shows, however, that this intention comes to nought, because here the single individual is the stronger part. It seems to me as if the refinement concept becomes more faceted in the hands of Solsjenitsyn through the fact that it can be discussed in the interplay between model and individual.

In "Kallocain" the discussion to an even higher extent concerns the effects of the organisation on the structure, that is, on the relation between the individuals. The reader gets a from inside -perspective by following an official's mental preparedness and stepwise change. Of import is not the unravelling of the story but the moral disorder, which follows the refinement ideology. In this way, the novel causes questions of the kind that the creator himself of the scientific model, Skinner, posed in his literary work "Beyond freedom and dignity" (1972). For example: Aren't freedom and dignity constructions, which are irrelevant in the light of a secularised world's civilisation efforts?

Summary

The duty of education is to contribute to the competence development of the people. The mediation of the conceptual relations of a subject of study creates knowledge and makes the individuals more or less qualified. However, if we shall enhance the competence of individuals, we need to develop materials, which make transparent the relation between knowledge and its application in practice. In this article, I have tried to show that it is important to be able to control the structure of a material, so that the teacher can make the bridge between theory and practice. Not until then the students will get a grasp of the concepts. I have further shown that for the first time there exists a method, which can do the job for the teacher. So what are we waiting for?

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